

Memorandum

TO: Lawrence Capps, Knightdale Police Department
FROM: Spencer White and Jennifer Ganapathy
SUBJECT: Knightdale Speed Reduction Project
DATE: 05/19/16

Summary

The town of Knightdale, NC, located in Wake County, 20 minutes east of Raleigh, is attempting to reduce speeding within residential subdivisions. The majority of citizens obey speed limits and the average speed for neighborhoods in Knightdale is within 4 miles of the posted speed limit. However, there can be a perception among some Knightdale residents that speeding is a problem due to outliers whose maximum speed through residential neighborhoods can be in excess of 60 miles per hour.

The Knightdale police department has tried speed monitoring, increased police presence, physical barriers, speed limit reductions and informational campaigns. Some of these efforts have proven successful in the short run, but none have had a sustained impact on speeding perceptions. Knightdale has a population of just over 13,000 residents with a median age of 31.6 years old and is the seventh fastest growing city in North Carolina (second fastest in the Triangle). The median household income is \$71,066 according to census estimates. Knightdale is serviced by four elementary schools and one high school which all belong to the Wake County school district.

We are focusing our efforts on influencing speeders driving at 60 mph or more in 25 mph zones rather than lower-level speeders (those driving at 30 mph in 25 mph zones). Drivers speeding at 60 mph or more are considered to be outliers by the Knightdale Police Department. Speeding culprits are either a small population of repeat offenders or more likely community members as a whole, occasionally speeding in isolated incidents. The goal of our intervention is to increase the social stigma around speeding so that residents self-regulate their driving speed more effectively.

Our literature review found a number of logistical and psychological barriers to reducing speeding. Psychological obstacles represent several major barriers. Drivers may feel that their speed is reasonable even though it is above the speed limit or that speeding is generally acceptable behavior. Normative Social Influence and the What-The-Hell Effect are behavioral economics principles that may partially explain the mindset of speeders. The Normative Social Influence describes a situation where people use other's behavior as a cue for what is acceptable. In the case of speeding, if residents see their neighbors speeding down the street, they might assume that it is acceptable for them to speed as well. The What-The-Hell Effect describes a self-control situation in which a person falls off track away from completing a goal and then gives up on the goal entirely. Once a driver speeds and does not encounter a consequence, then the driver may infer that it is acceptable to speed in the future.

Drivers may also be ignoring specific warnings and speeding tickets due to the behavioral economics principle of Counterfactual Regret. This principle states that people's satisfaction depends on outcomes and ideas about what could have happened. The Knightdale Police Department has leveraged its patrol force to set up rotating speeding stings to try to curb speeding. They do not have enough resources to police all neighborhoods at all times. If a driver chooses to slow down in an area where he or she had been expecting an officer to be monitoring the road, the driver might be more inclined to speed in the future. Ironically, the police

department has even reported that some of the community residents that have made speeding complaints have been pulled over for speeding.

Further, speeding data presented to residents in the community by the Knightdale Police Department in the form of numbers and statistics may not appeal to them. Residents may see one or two excessive speeders over a long period of time and draw erroneous conclusions about the safety of their community that is not supported by evidence. This is the behavioral principle of Saliency, where individuals overestimate the likelihood of something easily imagined or frightening, such as car accidents.

Finally, some residents may be unwilling to accept that speeding is not a major issue in their neighborhood despite the speeding statistics relayed by the police department. The Anchoring principle describes a situation in which people are biased by the first number, figure or fact that they hear. Knightdale residents have perceived speeding in their neighborhoods so they are unlikely to believe that speeding is not an issue based on statistics. Additionally, it may be easier for residents to recall speeders rather than non-speeders. According to data captured by STEALTH speed cameras that monitor roads without alerting drivers, the majority of speeders travel within a few miles over the speed limit. However, there are outliers who occasionally speed in excess of 35 mph over the speed limit.

The logistical barriers to speed reduction include a lack of relevant speeding information. Authorities are unable to identify speeders who are repeat and frequent offenders or there may be occasional speeders. The police are unable to determine with certainty whether the speeders are neighborhoods residents or outsiders passing through without any community ties. If the speeders are local residents, the community members may be able to identify them by car or face. If the speeders are not local residents but are speeding in the same subdivision or across various subdivisions repeatedly, the community may be able to identify them by other means such as taking photos of their license plates. However, if the speeders are community outsiders and not a group of repeat offenders, the community may have a difficult time identifying and exerting social pressure on them to reduce speeding.

Hypothesis

Our hypothesis, focusing on the concepts of normative social influence and social proof, is that the Knightdale police sponsor a community speed reduction competition that asks neighborhoods to compete to reduce speeds. The goal is to use the competition to enforce social norms about neighborhoods speeding that help both the community feel that action is being taken to reduce the problem and causes speeders to change behavior.

The literature in Sibley and Harre's research, "The Impact of Different Styles of Traffic Safety Advertisement on Young Drivers' Explicit and Implicit Self-Enhancement Biases", explored the impact of positively framed and negatively framed safety campaigns on driving speeds. They found that negatively framed campaigns did not reduce speeds while positively framed campaigns did result in some reduction. However, the intentionality of the driver is not always clear. Consequently, positively framed campaigns may have some impact on driving speeds by providing feedback about speeding behaviors deemed to be correct by this particular community, thereby encouraging drivers to adopt the assumed correct behavior.

Intervention Design and Methodology

Our intervention was to publicize speed reduction efforts as part of a public campaign. The Safe Neighborhoods Competition was a town-wide event that put neighborhoods in competition with one another, each striving to be the community with the safest drivers. Over the course of the competition, drivers' speeds were measured using STEALTH devices prior to the public campaign efforts and after the competition was advertised. STEALTH devices are able to capture information about motorists' speeds without drivers being aware that they are being measured. The data generated from the STEALTH equipment includes: total number of cars, average speed, median speed, speed at the 85th percentile, and the maximum speed. Each STEALTH device was deployed for two weeks at a time.

Residents presumably knew that their speeds were being measured, however, they did not know when or where the STEALTH devices were set up. Each neighborhood had a point of contact responsible for coordinating with the Knightdale Police Department on this effort. Through these neighborhood contacts we issued a Qualtrics survey assessing baseline perceptions of speeding and public safety in Knightdale. In order to measure perceptions around speeding we put into the field a baseline Qualtrics survey measuring overall perceptions of speeding and safety in the Knightdale community. We distributed this survey through the Homeowner's Association listservs and received 70 responses.

Results

The STEALTH data showed interesting results. The vast majority of driver's, as would be expected, were grouped between 25-29 MPH. Below are the results from the competition. Round 1 is the baseline measurements prior to the advertising campaign and Round 2 is the second round through each neighborhood. In several cases there were several measurement sessions due to battery changes. We averaged together the total of all sessions for each round (between 1 and 3 sessions per round) to get the average speed for each round. MS stands for marginal speed and is the difference between the final average speed and the speed limit. The change in speed is the difference between the Round 1 average speed and Round 2 average speed.

Neighborhood	Average Speed		MS	Change in Speed
	Round 1*	Round 2*		
Mingo Creek	26.4	28.2	3.2	-1.8
Princeton Manor	27.9	27.7	2.7	0.2
Churchill	24.5	23.2	-1.8	1.3
Cheswick	22.0	22.4	-2.6	-0.5
CarringtonWoods	23.7	20.9	-4.1	2.8

*Average of all sessions

Carrington Woods had both the lowest and highest change in speed (average speed reduced by 2.8 MPH) but also the lowest MS at 4.1 MPH under the speed limit. Churchill followed with 1.3

MPH decrease in speed and a MS below the speed limit. Though no statistical analysis was performed, the Cheswick and Mingo Creek increased between the first and second measurement. An initial survey was conducted at the start of the experiment that found that overall perceptions of speeding and public safety in Knightdale are positive. The vast majority of respondents would recommend Knightdale as a community to raise their children to others (average answer 8 out of 10 on a 10 point scale), and the vast majority find Knightdale streets safe for their children to play (average answer 8 out of 10 on a 10 point scale). Further, when asked how many days they speed a month people put an average of 10 days while collectively noting that anything above 7 MPH over the speed limit is what they consider to be speeding. This leads us to believe that it is the same members of the community engaged on many other issues that are sometimes the people speeding. This is encouraging as they are likely engaged enough to be susceptible to social pressure.

Recommendations:

1. 24-hour monitoring

Digging deeper into the STEALTH data, it appears that most of the outlier speeds happen between 11pm-4am. This leads us to believe it is at a time when speeders believe they will not be caught by police or community members. It may also support the idea that it is community self-enforcement that works best to reduce speeding. It is only when a driver believes they will not receive negative feedback and will not be seen (e.g. the community is not awake) that they feel comfortable speeding.

One solution could be posting signs in high speeding areas stating that the area is being monitored by police and publicizing the results every few months at Homeowner's Association or other community meetings. This could create a sense of social pressure even when there is no one present.

2. Annual Competition

Continue the competition concept but initiate an awareness campaign so that community members recognize that it is late-night speeding that is negatively affecting neighborhood speed reduction numbers in the contest. The aim would be to create a norm around driving closer to the speed limit through neighborhoods at night even when speeders will not be seen by community members.